

# Vaidehi Wagh

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## Education

### Carnegie Mellon University

Master of Science in Robotics | GPA: 4.0/4.0

Expected May 2026

Pittsburgh, Pennsylvania

Coursework: Talking to Robots (LLMs) | Computer Vision | Reinforcement Learning | Medical Robotics | Optimal Control

Teaching Assistant: Multimodal Machine Learning, Computer Vision

### College of Engineering, Pune

B. Tech in Mechanical Engineering | GPA: 8.83/10

May 2023

Pune, India

## Research Experience

### MetaMobility Lab

October 2024 – Present

Pittsburgh, PA

Graduate Research Assistant | Supervisor: [Dr. Inseung Kang](#)

- Integrating **vision-language models** with **Meta Aria Glasses**, using **multimodal scene understanding and audio-based user feedback** to personalize exoskeleton control parameters to build a robust human-in-the-loop system.
- Deployed **quantized LLMs on edge (Jetson Orin Nano 8GB)** using **Whisper-transcribed user feedback** to generate adaptive exoskeleton control commands with **sub-3s latency**.
- Aligned datasets with incompatible sensor configurations using **OpenSim & MATLAB APIs**, using simulated sensor data to train **temporal convolutional networks** in Pytorch to predict **temporal joint torques** during locomotion.
- Applied **transfer learning** to personalize models for post-stroke individuals, achieving a **27% gain** in prediction accuracy with **less than 0.2% of training data taken from the subject**.

### Neuroplasticity, Imagery and Motor Behaviour Laboratory

May 2022 – August 2025

Kelowna, BC

Research Intern | Supervisor: [Dr. Sarah Kraeutner](#)

- Deployed a **motion tracking pipeline** using **OpenCV** and **MediaPipe** pose estimation to analyse upper-limb kinematics (**~0.14M actions, ~0.3M frames**) & identify key markers of maladaptive compensation strategies in post-stroke individuals.
- Led a validation study comparing low-cost hand tracking to traditional motion capture using shape similarity analysis (**16K fine upper-limb motion trajectories, ~70% accuracy**) demonstrating a scalable solution for monitoring fine motor movements in clinical settings.

## Publications

[1] Wagh et al., “Transfer learning for biological joint moment estimation in stroke populations”, American Society of Biomechanics 2025. ([link](#), pg 51)

[2] Wagh et al., “Using MediaPipe to track upper-limb reaching movements after stroke: a proof-of-principle study”, Journal of NeuroEngineering and Rehabilitation, 2025. ([link](#))

[3] Wagh et al., “Quantifying Similarities Between MediaPipe and a Known Standard to Address Issues in Tracking 2D Upper Limb Trajectories: Proof of Concept Study”, Journal of Medical Internet Research: Formative Research, 2024. ([link](#))

## Professional Experience

### Deloitte Touche Tohmatsu Ltd

August 2023 – June 2024

Pune, India

Analyst

- Deployed cloud-based pipelines and visualization tools for **large-scale financial time-series data**, implementing temporal forecasting and analytics to automate reporting and generate actionable insights.

### LightRay Technologies – Early-stage startup

November 2022 – May 2023

Pune, India

Computer Vision Intern

- Fine-tuned a Tiny-YOLOv4 model in PyTorch on a custom 12k image dataset, achieving **94.6%** class-wise accuracy to improve **real-world object detection** in complex driving environments.

## Projects

### LLM based human-robot voice interface – Talking to Robots

August 2025 – Present

- Finetuned (SFT) Qwen3-VL-2B to enable **long-horizon planning** using **multimodal vision audio** inputs for exoskeleton control.

### Automated IV insertion Bot – Medical Robotics

August 2025 – Present

- Designed and 3D-printed **custom linear actuators, developed & integrated robot arm control and vision-based vein detection** pipelines to reduce procedure time by **23%**.

### Generative Adversarial Imitation Learning – Introduction to Robot Learning

January 2025 – April 2025

- Used **inverse RL** with **state-level Bidirectional GANs** and **trajectory-level GAIL** for learning humanoid locomotion rewards.

## Skills

**Programming & ML:** Python (PyTorch, OpenCV, Ollama, Llama-cpp, HuggingFace), MATLAB, R, Julia, Git, Docker, Linux, WSL,

Quantization | **Robotics/Embedded:** NVIDIA Jetson, Arduino, ESP32, Raspberry Pi | **Design & Sim:** SolidWorks, Fusion 360, Inventor, AutoCAD, OpenSim, MuJoCo